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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/822,191	04/02/2001	Takeshi Shishido	35.C15262	7314

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EXAMINER

PADGETT, MARIANNE L

ART UNIT PAPER NUMBER

1762

DATE MAILED: 06/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

5

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	09/822,191		SHISHIDO ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Marianne L. Padgett		1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 April 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,6,8,10-15,20 and 22-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,6,8,10-15,20 and 22-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/27/2006 has been entered.

The amendment to 4/27/2006 corrects the 112 problem as discussed in section 1 of the action mailed 12/29/2005, but does not create the scope problems that were mentioned with respect to a similar, but not identical, amendment submitted with the after final of 3/16/2006, as this amendment maintains the language of "heating element comprising a first metal member".

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 6, 8, 12-15, 20, 22 and 26-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoichi Tanimura (JP 04-136175), {optionally in view of Ikeda et al (JP 8-299748)}, and further in view of Tomoyasu et al (5,900,103), as discussed in sections 11, 6, 3 & 3 of the 5/25/04, 12/28/04, 7/5/2005 & 12/29/2005 rejections, respectively.

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It is noted that as amended the option of a heater incorporated as part of the line structure, but not necessarily enclosed by the line, for instance within the wall of the exhaust path or line, has been reinstated in the claims' language, hence Ikeda et al. is again an optional reference, but may be applied as previously discussed for the alternative waste product heat treatment technique where "in an exhaust line" is enclosed by the exhaust line.

As was previously noted with respect to the "heating element...in an exhaust line," that this phrasing is inclusive of such an element enclosed or within the exhaust line or pipe (illustrated by Ikeda et al.'s electric heat coils 64, 72, 88, etc.), or such a heater incorporated as part of the line, for instance within the wall of the exhaust path or line, as illustrated in Shoichi Tanimura's Figures 2 or 4. Given applicant's example shown by reference No. 13a-c in Figure 1, the examiner still suspects that the former is the intended meaning, but the present phrasing is again inclusive of both options. The "in" phrasing was previously noted to be found in original claims.

The Japanese references to Shoichi Tanimura and Ikeda et al, were discussed in the actions mailed 5/25/04 (Sections 11 and 13) and 12/28/04 (Section 6), with respect to their English abstracts, and the translation of Tanimura discussed in the action mailed 7/5/2005, with reiteration thereof below. Tanimura supplies the teaching of reacting unreacted gases in the exhaust line coming from plasma or thermal CVD chambers for the purpose of preventing dust production in the exhaust line and preventing deterioration of the vacuum pump. Reaction means in the exhaust line may include use of heaters to cause thermal reactions as illustrated in Figures 2 or 4, or RF electrodes to cause plasma reactions as in Figure 3, whereas page 8, notes that the later may also use the heater option with the electrodes. As noted above, as shown in Tanimura, the heating element 13 is "in" the exhaust line consistent with the claim language. In the translation, see the claims; page 5, especially second full paragraph; pages 6-9 for descriptions of relevant Figures 2-5. Although, Tanimura does not discuss the material used for the

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illustrated heating coils, they are typically metal to enable electrical conduction & resistance heating, hence metal would have been obvious for its conventional use therefore it.

Alternately, Ikeda et al who is employing heat traps to decompose and deposit unreacted gases in exhaust from CVD processing, may employ heating coils inside or enclosed by the exhaust pipe as previously discussed and illustrated in Figures 2-3, 6-7, 9 and 13, where there is teaching of the electric heating coil, including stainless steel in its composition, or batteries with heating wire employing tungsten conductive members ([0020] and [0031-32]). Therefore, it would have been obvious to one of ordinary skill in the art to employ heating elements inside the exhaust pipeline as taught in Ikeda et al, in the plasma processing techniques of Tanimura et al, as it has been shown to be equivalent effective for like purposes of preventing pump damage. Also Ikeda et al. substantiates the obviousness of the heating element being metal by providing examples of specific metal heating coils which one of ordinary skill & competence in the art would have expected to have been ineffective to provide for the illustrated heating coils in Tanimura, as their purpose is analogous.

Tanimura, optionally considering Ikeda et al, differs from the present claims by not teaching a "plasma blocking means" of an electrically grounded second metal, between the processing space and the metal heating element. It is noted that the illustrated plasma apparatus of Figure 5 in Tanimura has an elbow bend in the exhaust line that will cause physical blocking of at least some plasma flow before arriving at the "unreacted gas reaction chamber", but the structure of the bend is disclosed as neither metal nor grounded.

Tomoyasu et al teach a parallel plate plasma treatment process for semiconductive wafers analogous to that of Tanimura's Figure 5, where the plasma may relate to etching or CVD or sputtering, where it is taught to employ a baffle plate arrangement, where plural holes in the plates are configured to adjust flow of exhaust and also via a gradient electric field to prevent discharge in the holes and prevent plasma from flowing inward under the baffle plates. These are clearly acts of blocking plasma, thus

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means to do so. The plate or inner portion of the baffle may be made of metal, such as Al or stainless steel, and different options for powering the plasma (applying H.F. power to upper electrode or susceptor) may be employed, where the potential of the baffle may be the same as that of the susceptor, or as that of the upper electrode, to effect different plasma distributions. See the abstract; Figures 8, 12-13, 15-17, 29-33; col. 1, lines 5-10; col. 10, lines 36-col. 13, line 41, esp. col. 11, lines 1-15 & 25-40, plus col. 12, line 40-col. 13, line 4 & 20-29 (baffle or baffle + shield prevents plasma from entry openings on the other side of it with respect to the plasma space); and col. 16, lines 4-45 (use of gradient electric field with baffles, prevents discharge from being caused in baffle holes & prevent plasma from flowing inward under the baffle plate & configurations for preventing abnormal discharge in plasma generation). While Tomoyasu et al teach various different possible potentials employed on the baffle, they do not discuss grounding it per se, but they note that their broader aspects are not limited to specific details (col. 19, lines 26-30), and as paired parallel electrodes are frequently employed with one powered and the other grounded, it would have been obvious to one of ordinary skill that the applied baffle potential could have been at ground, since it could be the same as either electrode; which would have been different than the overall plasma potential. It is further noted that choice of an applied potential or grounding would have been highly dependent on the specific plasma generation configuration employed in a particular plasma processing apparatus, which for the present claims is entirely unspecified.

It would have been obvious to one of ordinary skill in the art to use baffle arrangements as taught by Tomoyasu et al with Tanimura's plasma apparatus/process, due to the improved flow control, prevention of abnormal discharge and preventing chamber contamination, taught to be achieved therewith, as they would have been beneficial in Tanimura's plasma also, and consistent with their purposes. Use of two separate affluent control and processing means in the same exhaust line, where these means provide complementary benefits that are both desirable for reasons given for employing each separately, would have been obvious to one of ordinary skill in the art to use either together or separately

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as their benefits would have been expected to be cumulative and neither technique interferes with the other.

4. Claims 10-11 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanimura, {optionally in view of Ikeda}; and further in view of Tomoyasu et al as applied to claims 1, 6, 8, 12-15, 20, 22 and 26-30 above, and further in view of Kanai et al (5,976,257), as previously described in Sections 13 & 4 of the actions dated 5/25/2004 & 7/5/2005, respectively.

As previously stated, the above combinations uses metal baffle plates with holes to block plasma entrance into the exhaust line, but does not discuss alternative shapes, such as meshes or spiral windings, however Kanai et al (257) has been seen to teach metal mesh as equivalent to perforated plates for preventing leaks of plasma energy creating unstable plasma at exhaust ports, hence shows an equivalent use to that of Tomosayu's baffles, where the plural holed baffle and the perforated plate are synonymous or equivalent structures. It is also noted that meshes are generally made of wires, and that Tomosayu's Figure 32 creates a spiral-like structure via layers rather than wires, but as wire structure and layer structure that prevent control exhaust passage may be employed equivalently, it would have been obvious to one of ordinary skill that creating relatively equivalent to structured flow passages via wire or layers would have been expected to have been equally effective, hence obvious variations on the same theme.

5. Applicant's arguments filed 4/27/2006 and discussed above have been fully considered but they are not persuasive.

Discussion in the remarks on page 9 of the 4/27/2006 response concerning "a plasma may be deemed 'block' when residual plasma measured beyond blocking means has a reduced electron density "Ne" of 10% or less of the electron density of the plasma generated in a processing space", citing page 18, lines 8-13 are noted. However, it is also noted that the disclosure on page 18 of the specification does not rise to the level of a definition, such that the claimed "plasma blocking means" is not considered to require any specific electron density in the region it has blocked. Furthermore, while Tomosayu does not

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provide any teachings of electron density, and the PTO can not measure what electron densities would be present after baffle constructions as taught therein have prevented the flow of plasma into the space leading into the exhaust lines of their plasma apparatus, the taught prevention of plasma flow is consistent with the claim limitation of plasma blocking, and one of ordinary skill would not have expected given the teachings of this tertiary reference for electron density numbers in the region after baffle (i.e. at, near or in the exhaust line) to be a range which would be considered to define a plasma, and furthermore given Tomosayu's teachings a competent practitioner in the plasma art would have been expected via routine experimentation to adapt the baffle teachings for plasma flow prevention to the configurations of specific plasma apparatus.

On page 12 of their response applicant State "... the baffle plate cannot be used as a plasma blocking means. Accordingly, since baffle plate 326 generates plasma, there is no motivation to use it to block plasma, to prevent plasma for reaching a chemical-reaction inducing means", which is in clear contradiction of Tomosayu's own teachings, such as found on col. 16 with respect to figures 29-33, which discusses baffle plate 635 and holes therein stating "the conductance of gas rises when it passes through the holes 634 and the gradient of the electric field becomes gentle accordingly. This prevents discharge from being caused in the holes 634 and plasma from flowing inward under the baffle plate 635. ..." One does not need motivation to prevent plasma flow, as the prevention of plasma flow has explicitly been taught. Further, note on col. 16, lines 30-41, Tomosayu recognize that prior art apparatus did have a problem of allowing plasma flow inward under the baffle plate and discharges that could cause problems, however this patent provides teachings said to prevent such problems, which are thus consistent with applicant's claim of a plasma blocking means.

6. Other art of interest to the state of treating waste gas from CVD and/or plasma processing, but which is not prior art includes: Hogan (7,022,293 B2); Hasegawa (7,022,298 B2); Seol



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(2006/0051254 A1); Mardian et al. (7,044,997 B2 & 2006/0101993 A1); and Bailey, III et al.

(2006/0105575 A1 & 7,009,281 B2)


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on M-F from about 8:30 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MLP/dictation software

6/22/2006



MARIANNE PADGETT  
PRIMARY EXAMINER